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PATENT ABSTRACTS OF JAPAN

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(54) VIDEO INFORMATION TRANSMISSION/RECEPTION AND VIDEO PROCESSING METHOD

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a digital information transmission/reception method whereby a sender side eliminates the need for an MPEG moving picture for reverse reproduction or the like purposely and a receiver side can smoothly reverse-reproduce an MPEG moving picture or the like for a streaming service.

SOLUTION: A transmitter side of video information divides the MPEG moving picture into a plurality of blocks (B1 to B5) and transmits the blocks to a receiver side from the temporally-later block (B5). When the receiver side receives the blocks B, the receiver side extracts a temporally-later GOP in the blocks B, converts each video image into I pictures (112134151617) applies reverse sequence rearrangement processing to the I picture video image (1716151413 1211) and displays the video images. Then the processing above is executed for the GOP in the order of the GOP arranged in a temporally-reverse order in the blocks, and performs the reverse

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CLAIMS

[Claim(s)]

[Claim 1] If two or more video information of a bundle ball is blocked, it sends out from a back block to a receiver in time in the transmitting side of video information and a block is received in a receiver, After taking out a back image group unit in time within the block concerned and changing each image into an independent refreshable form within an image group unit, reverse order rearrangement processing of an image is performed, A video information transceiver graphic processing method performing reverse order-sized processing which is performed in order of an image group unit located in a line with a time opposite direction within a block of said processing to said image group unit, and is performed to said block one by one to the following block.

[Claim 2] A video information transceiver graphic processing method performing transmitting and receiving processing of the following block in a video information transceiver graphic processing method according to claim 1 while performing said reverse order-sized processing to 1 block.

[Claim 3] Processing which shifts time mutually about video information of two or more same bundle balls in the transmitting side of video information, and is respectively sent out from a head as another stream is performed, In a receiver, a stream change is performed according to a demand of reverse order reproduction, Accumulate video information until an image of a demand point of reverse order reproduction comes to hand, and a back image group unit is taken out in time to this accumulated video information, A video information transceiver graphic processing method performing reverse order rearrangement processing of an image after changing each image into an independent refreshable form within an image group unit, and performing said processing to said image group unit in order of an image group unit located in a line with a time opposite direction within accumulation video information.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application]This invention relates to the video information transceiver graphic processing method.

[0002]The digital-broadcasting receiving set which receives digital broadcasting using a satellite or a terrestrial wave, Arbitrary broadcast waves are chosen with a tuner out of two or more broadcast waves received through an antenna for exclusive use and antenna for terrestrial waves. A video voice signal can be outputted by choosing arbitrary channels by demultiplex processing out of two or more channels contained in this selected broadcast wave, taking out the digital signal of this selected channel, and decoding this.

[0003]It is possible by having many channels in such a digital broadcast system to shift movie broadcast at intervals of 10 minutes, and to broadcast by two or more channels for example. Thereby, it becomes possible of each television to watch broadcast from the start according to one's time. Such broadcast is realizable also in IP multicast service of cable TV or Internet broadcasting. This service is called NVOD (near video on demand).

[0004]

[Problem to be solved by the invention]In the digital broadcast system, an image and a sound are processed based on the system of MPEG 2 (Moving Picture Experts Group2), and the video stream and the audio stream are generated. And although applicant of this application has applied for the method of performing reverse reproduction smoothly to the animation of such an MPEG system, previously (refer to JP.2001-346165A: IPC H04N 5/92). It is not taking into consideration about real time streaming service [of a digital broadcast system etc.] reverse reproduction. By the way, if the animation of the MPEG system based on the digital information of the reverse reproduction image which acquired it by carrying out reverse reproduction of the image is prepared by the informer side and this reverse reproduction MPEG animation is transmitted, at the receiver, can see the reverse reproduction image by the usual MPEG regeneration, but. Now, it will be necessary to prepare a reverse reproduction MPEG animation specially by the informer side.

[0005]By a receiver, an object of this invention is to provide the digital information transmitting and receiving method which can carry out reverse reproduction of the MPEG animation etc. smoothly to streaming service, without preparing the MPEG animation for reverse reproduction, etc. specially by the informer side in view of the above-mentioned situation.

[0006]

[Means for solving problem]In order that a video information transceiver graphic processing method of this invention may solve above-mentioned SUBJECT, in the transmitting side of video information. If two or more video information of a bundle ball is blocked, it sends out from a back block to a

receiver in time and a block is received in a receiver. After taking out a back image group unit in time within the block concerned and changing each image into an independent refreshable form within an image group unit, reverse order rearrangement processing of an image is performed, it performs in order of an image group unit located in a line with a time opposite direction within a block of said processing performed to said image group unit, and reverse order-ized processing performed to said block is performed one by one to the following block.

[0007]Without preparing video information for reverse reproduction specially by the informer side, if it is the above-mentioned composition, the usual video information is prepared and it ends with taking out a back block in time and transmitting in a stage of sending out. And after taking out a back image group unit in time within a received block at a receiver and changing each image into an independent refreshable form, reverse order rearrangement processing of an image is performed. Since it performs in order of an image group unit located in a line with a time opposite direction within a block of said processing to said image group unit, a reverse reproduction image can be seen.

[0008]While performing said reverse order-ized processing to 1 block, it is good to perform transmitting and receiving processing of the following block. According to this, a way piece of reverse reproduction during a block is avoidable.

[0009]The video information transceiver graphic processing method of this invention, Processing which shifts time mutually about the video information of two or more same bundle balls in the transmitting side of video information, and is respectively sent out from a head as another stream is performed. In a receiver, a stream change is performed according to the demand of reverse order reproduction. Accumulate video information until the image of the demand point of reverse order reproduction comes to hand, and a back image group unit is taken out in time to this accumulated video information. After changing each image into an independent refreshable form within an image group unit, reverse order rearrangement processing of an image is performed, and said processing to said image group unit is performed in order of the image group unit located in a line with a time opposite direction within accumulation video information.

[0010]According to this, a reverse reproduction image can be seen also in NVOD of digital broadcasting or an IP multicast.

[0011]
[Mode for carrying out the invention]First, reverse reproduction processing of an MPEG animation is briefly explained using drawing 3. The image group unit (henceforth GOP) of an MPEG animation is supplied to MPEG decoder 51 one by one from a next thing in time. MPEG decoder 51 decodes each GOP and generates I picture, P picture, and B picture. By frame inner code-ized processing, I picture is a picture independently generated regardless of the reproduced image of the past or the future, and at least one sheet exists in GOP. P picture is generated by interframe coding processing by forward direction prediction. B picture is generated by interframe coding processing by bidirectional prediction. MPEG encoder 52 inputs I picture outputted from MPEG decoder 51, P picture, and B picture. Here, it is assumed that the picture of seven per 1GOP is inputted. MPEG encoder 52 performs processing which forms P picture and B picture into I picture. Thereby, I picture of seven sheets is generated. I picture of seven sheets is located in a line with Masayori, and expresses the order as $I_1I_2I_3I_4I_5I_6I_7$. $I_1I_2I_3I_4I_5I_6I_7$ is once stored in the memory 54 and is read in order of $I_1I_6I_5I_4I_3I_2I_1$. MPEG decoder 53 receives I picture of seven sheets from the memory 54 in order of $I_1I_6I_5I_4I_3I_2I_1$, performs decoding processing of these I picture one by one, and generates video. Reverse order reproduction is realized by this processing being performed one by one to next GOP in time next.

[0012]Drawing 1 is a figure showing the video information transceiver graphic processing method of this embodiment, the figure (a) shows the case where it is applied in the stream service by the Internet, and the figure (b) shows the case where it is applied to a digital broadcast system.

[0013]In the example shown in the figure (a), the server 11 and the information terminals (a personal computer, a personal digital assistant, etc.) 12 are connected via the Internet 13, and contents (here, it is considered as an MPEG animation) are distributed to the information terminal 12 which is a client from said server 11. The server 11 should just prepare the usual MPEG animation rather than prepares a reverse reproduction MPEG animation. When

the server 11 receives the demand of reverse order reproduction from the information terminal 12, the server 11 will block two or more MPEG animations (video information of a bundle ball), and will send out to a receiver from a back block in time.

[0014] In the example shown in the figure (b), the digital information (modulated electric wave) unlinked by the broadcasting organization equipment 21 reaches the domestic digital-broadcasting receiving set 22 via the transponder of the satellite 23. Although the graphic display has not been carried out, if it is ground wave digital broadcast, the digital information (modulated electric wave) from a terrestrial station will reach the inside of a home, or the portable digital-broadcasting receiving set 22. Thus, contents (here, it is considered as an MPEG animation) are distributed by the digital broadcast wave. The broadcasting organization equipment 21 should just prepare the usual MPEG animation rather than prepares a reverse reproduction MPEG animation. And a certain channel is assigned to reverse order reproduction, and in transmission by this channel, the broadcasting organization equipment 21 will block two or more MPEG animations (video information of a bundle ball), and will send them out from a back block in time.

[0015] Here, as shown in drawing 2, it supposes that an MPEG animation is blocked by and will send them out from a back block in time in order of B5, B4, B3, B-2, and B1. Therefore, in the receiver, next block B5 will be received first in time, and this will be held in the memory. Since [of this block B5] it sets to begin to receive and there is no data of whole block B5, the start of reverse reproduction is impossible, the stage which received the data of whole block B5 --- the inside of block B5 --- next data is able to be acquired in time, then, the inside of block B5 from a memory --- a next image group unit (henceforth GOP) is read in time, and reverse order regeneration is performed. Here, suppose that one block on [of explanation] expedient comprises five GOP(s). In block B5, GOP presupposes that it stands in a line like B5₁, B5₂, B5₃, B5₄, and B5₅ by Masayori. It is assumed that the picture of seven per 1GOP exists.

[0016] If drawing 3 is used again here and explained, MPEG encoder 52 will perform processing which forms into I picture P picture and B picture which exist in B5₅ first. Thereby, I picture of seven sheets is generated. I picture of seven sheets is located in a line with Masayori, and expresses the order as B5₅ (1₁2₁3₁4₁5₁6₁7₁). B5₅ (1₁2₁3₁4₁5₁6₁7₁) is once stored in the memory 54, and is read in order of B5₅ (1₁2₁3₁4₁5₁6₁7₁). MPEG decoder 53 receives I picture of seven sheets from the memory 54 in order of B5₅ (1₁2₁3₁4₁5₁6₁7₁). performs decoding processing of these I picture one by one, and generates video.

[0017] Next, MPEG encoder 52 performs processing which forms into I picture P picture and B picture which exist in B5₄. Thereby, I picture of seven sheets is generated. I picture of seven sheets is located in a line with Masayori, and expresses the order as B5₄ (1₁2₁3₁4₁5₁6₁7₁). B5₄ (1₁2₁3₁4₁5₁6₁7₁) is once stored in the memory 54, and is read in order of B5₄ (1₁2₁3₁4₁5₁6₁7₁). MPEG decoder 53 receives I picture of seven sheets from the memory 54 in order of B5₄ (1₁2₁3₁4₁5₁6₁7₁). performs decoding processing of these I picture one by one, and generates video.

[0018] Reverse order reproduction in block B5 is realized by the above-mentioned processing being performed one by one to GOP of time back order. When reverse order reproduction of this block B5 is completed, reverse order reproduction in block B4 will be started, and reverse order reproduction of an MPEG animation which comprises five blocks B1 - B5 will be performed by sequential execution of such processing being carried out.

[0019] Here, in parallel to processing of reverse order reproduction in block B5, reception of block B4 is continued and data of this block B4 is stored in a buffer. Thereby, processing of reverse order reproduction in following block B4 can be immediately begun after completion of reverse order reproduction in block B5.

[0020] If it is an example using the Internet 13 shown in drawing 1(a), the information terminal 12 can tell the server 11 the amount of buffers, and it is possible in the server 11 side to change a size of a block according to said amount of buffers.

[0021] In NVOD in an IP multicast, the server 11 will perform processing which shifts time mutually about two or more same MPEG animations, and is respectively sent out from a head as another stream. And the information terminal 12 performs a stream change according to a demand of reverse order

reproduction, An MPEG animation is accumulated until an image of a demand point of reverse order reproduction comes to hand, Back GOP is taken out in time to this accumulated MPEG animation, after changing each image into independent refreshable I picture within GOP, reverse order rearrangement processing of I picture is performed, and said processing to said GOP is performed in order of GOP located in a line with a time opposite direction within an accumulation MPEG animation.

[0022]For example, as shown in drawing 4, it supposes that there is stream ***** started by delay for 5 minutes, and it is assumed at the information terminal 12 that it recognizes that there is stream ***** started by delay for such 5 minutes. And at the information terminal 12, it assumes that stream ** was acquired and suppose that a user gave reverse order reproduction instruction to the information terminal 12 20 minutes after the start. If image offer 15 minutes after a start is performed in stream **, it changes to this stream ** and image acquisition for 5 minutes is performed at this time, an image of the after [20 minutes] of the after [15 minutes] of a start can be stored in the information terminal 12. And if the above-mentioned reverse order processing is performed to this accumulated video information, a reverse order reproduced image from a point in time of start 20 minutes to start 15 minutes can be seen. Here, by stream **, image offer 20 minutes after a start will be performed between image accumulation for 5 minutes, and image reverse order reproduction for 5 minutes. Then, if it changes to stream ** after the above-mentioned reverse order reproduction, an image 20 minutes after a start can be seen succeeding. Such processing is realizable also in a digital broadcast system of drawing 1 (a). In same form, a stream. ***** Data for 5 minutes is stored supposing that there is -- and looking at stream **, Reverse order reproduction of data (after 15 minutes - 20 minutes) stored promptly (after 20 minutes) when there are directions of reverse order reproduction from a user is performed, it switches to stream **, data (after 10 minutes - 15 minutes) is stored, and reverse order reproduction which continued when it switched with stream **** and went, performing reverse order reproduction succeeding is attained.

[0023]

[Effect of the Invention]As explained above, according to this invention, by a receiver, the effect that reverse reproduction of the MPEG animation etc. can be smoothly carried out to streaming service is done so, without preparing the MPEG animation for reverse reproduction, etc. specially by the informer side.

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TECHNICAL FIELD

[Industrial Application]This invention relates to the video information transceiver graphic processing method.

[0002]The digital-broadcasting receiving set which receives digital broadcasting using a satellite or a terrestrial wave, Arbitrary broadcast waves are chosen with a tuner out of two or more broadcast waves received through an antenna for exclusive use and antenna for terrestrial waves, A video voice signal can be outputted by choosing arbitrary channels by demultiplex processing out of two or more channels contained in this selected broadcast wave, taking out the digital signal of this selected channel, and decoding this.

[0003]It is possible by having many channels in such a digital broadcast system to shift movie broadcast at intervals of 10 minutes, and to broadcast by two or more channels for example. Thereby, it becomes possible of each televiewer to watch broadcast from the start according to one's time. Such broadcast is realizable also in IP multicast service of cable TV or Internet broadcasting. This service is called NVOD (near video on demand).

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EFFECT OF THE INVENTION

[Effect of the Invention]As explained above, according to this invention, by a receiver, the effect that reverse reproduction of the MPEG animation etc. can be smoothly carried out to streaming service is done so, without preparing the MPEG animation for reverse reproduction, etc. specially by the informer side.

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TECHNICAL PROBLEM

[Problem to be solved by the invention]In a digital broadcast system, an image and a sound are processed based on a system of MPEG 2 (Moving Picture Experts Group2), and a video stream and an audio stream are generated. And although applicant of this application has applied for a method of performing reverse reproduction smoothly to an animation of such an MPEG system, previously (refer to JP,2001-346165,A: IPC H04N 5/92). It is not taking into consideration about real time streaming service [of a digital broadcast system etc.] reverse reproduction. By the way, if an animation of an MPEG system based on digital information of a reverse reproduction image which acquired it by carrying out reverse reproduction of the image is prepared by the informer side and this reverse reproduction MPEG animation is transmitted, at a receiver, can see a reverse reproduction image by the usual MPEG regeneration, but. Now, it will be necessary to prepare a reverse reproduction MPEG animation specially by the informer side.

[0005]By a receiver, an object of this invention is to provide a digital information transmitting and receiving method which can carry out reverse reproduction of the MPEG animation etc. smoothly to streaming service, without preparing an MPEG animation for reverse reproduction, etc. specially by the informer side in view of the above-mentioned situation.

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MEANS

[Means for solving problem]In order that a video information transceiver graphic processing method of this invention may solve above-mentioned SUBJECT, in the transmitting side of video information, if two or more video information of a bundle ball is blocked, it sends out from a back block to a receiver in time and a block is received in a receiver, After taking out a back image group unit in time within the block concerned and changing each image into an independent refreshable form within an image group unit, reverse order rearrangement processing of an image is performed, It performs in order of an image group unit located in a line with a time opposite direction within a block of said processing to said image group unit, and reverse order-sized processing performed to said block is performed one by one to the following block.

[0007]Without preparing video information for reverse reproduction specially by the informer side, if it is the above-mentioned composition, the usual video information is prepared and it ends with taking out a back block in time and transmitting in a stage of sending out. And after taking out a back image group unit in time within a received block at a receiver and changing each image into an independent refreshable form, reverse order rearrangement processing of an image is performed, Since it performs in order of an image group unit located in a line with a time opposite direction within a block of said processing to said image group unit, a reverse reproduction image can be seen.

[0008]While performing said reverse order-sized processing to 1 block, it is good to perform transmitting and receiving processing of the following block. According to this, a way piece of reverse reproduction during a block is avoidable.

[0009]The video information transceiver graphic processing method of this invention, Processing which shifts time mutually about the video information of two or more scene bundle balls in the transmitting side of video information, and is respectively sent out from a head as another stream is performed, In a receiver, a stream change is performed according to the demand of reverse order reproduction, Accumulate video information until the image of the demand point of reverse order reproduction comes to hand, and a back image group unit is taken out in time to this accumulated video information, After changing each image into an independent refreshable form within an image group unit, reverse order rearrangement processing of an image is performed, and said processing to said image group unit is performed in order of the image group unit located in a line with a time opposite direction within accumulation video information.

[0010]According to this, a reverse reproduction image can be seen also in NVOD of digital broadcasting or an IP multicast.

[0011]

[Mode for carrying out the invention]First, reverse reproduction processing of an MPEG animation is briefly explained using drawing 3. The image group unit (henceforth GOP) of an MPEG animation is supplied to MPEG decoder 51 one by one from a next thing in time. MPEG decoder 51 decodes each

GOP and generates I picture, P picture, and B picture. By frame inner code-ized processing, I picture is it a picture independently generated regardless of the reproduced image of the past or the future, and at least one sheet exists in GOP. P picture is generated by interframe coding processing by forward direction prediction. B picture is generated by interframe coding processing by bidirectional prediction. MPEG encoder 52 inputs I picture outputted from MPEG decoder 51, P picture, and B picture. Here, it is assumed that the picture of seven per 1GOP is inputted. MPEG encoder 52 performs processing which forms P picture and B picture into I picture. Thereby, I picture of seven sheets is generated. I picture of seven sheets is located in a line with Masayori, and expresses the order as $I_1I_2I_3I_4I_5I_6I_7$. I picture of seven sheets is once stored in the memory 54 and is read in order of $I_1I_6I_5I_4I_3I_2I_1$. MPEG decoder 53 receives I picture of seven sheets from the memory 54 in order of $I_1I_6I_5I_4I_3I_2I_1$, performs decoding processing of these I picture one by one, and generates video. Reverse order reproduction is realized by this processing being performed one by one to next GOP in time next.

[0012]Drawing 1 is a figure showing a video information transceiver graphic processing method of this embodiment, the figure (a) shows a case where it is applied in stream service by the Internet, and the figure (b) shows a case where it is applied to a digital broadcast system.

[0013]In an example shown in the figure (a), the server 11 and the information terminals (a personal computer, a personal digital assistant, etc.) 12 are connected via the Internet 13, and contents (here, it is considered as an MPEG animation) are distributed to the information terminal 12 which is a client from said server 11. The server 11 should just prepare the usual MPEG animation rather than prepares a reverse reproduction MPEG animation. When the server 11 receives a demand of reverse order reproduction from the information terminal 12, the server 11 will block two or more MPEG animations (video information of a bundle ball), and will send out to a receiver from a back block in time.

[0014]In an example shown in the figure (b), digital information (modulated electric wave) uplinked by the broadcasting organization equipment 21 reaches the domestic digital-broadcasting receiving set 22 via a transponder of the satellite 23. Although a graphic display has not been carried out, it is ground wave digital broadcast, digital information (modulated electric wave) from a terrestrial station will reach the inside of a home, or the portable digital-broadcasting receiving set 22. Thus, contents (here, it is considered as an MPEG animation) are distributed by digital broadcast wave. The broadcasting organization equipment 21 should just prepare the usual MPEG animation rather than prepares a reverse reproduction MPEG animation. And a certain channel is assigned to reverse order reproduction, and in transmission by this channel, the broadcasting organization equipment 21 will block two or more MPEG animations (video information of a bundle ball), and will send them out from a back block in time.

[0015]Here, as shown in drawing 2, it supposes that an MPEG animation is blocked by five, B1 - B5, and the delivery side presupposes that it sends out in order of B5, B4, B3, B-2, and B1. Therefore, in the receiver, next block B5 will be received first in time, and this will be held in the memory. Since [of this block B5] it sets to begin to receive and there is no data of whole block B5, the start of reverse reproduction is impossible, the stage which received the data of whole block B5 -- the inside of block B5 -- next data is able to be acquired in time, then, the inside of block B5 from a memory -- a next image group unit (henceforth GOP) is read in time, and reverse order regeneration is performed. Here, suppose that one block on [of explanation] expedient comprises five GOP(s). In block B5, GOP presupposes that it stands in a line like B5₁, B5₂, B5₃, B5₄, and B5₅ by Masayori. It is assumed that the picture of seven per 1GOP exists.

[0016]If drawing 3 is used again here and explained, MPEG encoder 52 will perform processing which forms into I picture P picture and B picture which exist in B5₅ first. Thereby, I picture of seven sheets is generated. I picture of seven sheets is located in a line with Masayori, and expresses the order as B5₅ ($I_1I_2I_3I_4I_5I_6I_7$). B5₅ ($I_1I_2I_3I_4I_5I_6I_7$) is once stored in the memory 54, and is read in order of B5₅ ($I_1I_6I_5I_4I_3I_2I_1$). MPEG decoder 53 receives I picture of seven sheets from the memory 54 in order of B5₅ ($I_1I_6I_5I_4I_3I_2I_1$), performs decoding processing of these I picture one by one, and generates video.

[0017]Next, MPEG encoder 52 performs processing which forms into I picture P picture and B picture which exist in B5₄. Thereby, I picture of seven

sheets is generated. I picture of seven sheets is located in a line with Masayori, and expresses the order as B5₄ (1₁2₃4₅6₇). B5₄ (1₁2₃4₅6₇) is once stored in the memory 54, and is read in order of B5₄ (1₁2₃4₅6₇). MPEG decoder 53 receives I picture of seven sheets from the memory 54 in order of B5₄ (1₁2₃4₅6₇), performs decoding processing of these I picture one by one, and generates video.

[0018]Reverse order reproduction in block B5 is realized by the above-mentioned processing being performed one by one to GOP of time back order. When reverse order reproduction of this block B5 is completed, the reverse order reproduction in block B4 will be started, and reverse order reproduction of the MPEG animation which comprises five blocks B1 – B5 will be performed by sequential execution of such processing being carried out.

[0019]Here, in parallel to processing of the reverse order reproduction in block B5, the reception of block B4 is continued and the data of this block B4 is stored in the buffer. Thereby, processing of the reverse order reproduction in following block B4 can be immediately begun after completion of the reverse order reproduction in block B5.

[0020]If it is an example using the Internet 13 shown in drawing 1(a), the information terminal 12 can tell the server 11 the amount of buffers, and it is possible in the server 11 side to change the size of a block according to said amount of buffers.

[0021]In NVOD in an IP multicast, the server 11 will perform processing which shifts time mutually about two or more same MPEG animations, and is respectively sent out from a head as another stream. And the information terminal 12 performs a stream change according to the demand of reverse order reproduction. An MPEG animation is accumulated until the image of the demand point of reverse order reproduction comes to hand. Back GOP is taken out in time to this accumulated MPEG animation, after changing each image into independent refreshable I picture within GOP, reverse order rearrangement processing of I picture is performed, and said processing to said GOP is performed in order of GOP located in a line with a time opposite direction within an accumulation MPEG animation.

[0022]For example, as shown in drawing 4, it supposes that there is stream ***** started by delay for 5 minutes, and it is assumed at the information terminal 12 that it recognizes that there is stream ***** started by delay for such 5 minutes. And at the information terminal 12, it assumes that stream ** was acquired and suppose that a user gave reverse order reproduction instruction to the information terminal 12 20 minutes after the start. If image offer 15 minutes after a start is performed in stream **, it changes to stream ** and image acquisition for 5 minutes is performed at this time, an image of the after [20 minutes] of the after [15 minutes] of a start can be stored in the information terminal 12. And if the above-mentioned reverse order processing is performed to this accumulated video information, a reverse order reproduced image from a point in time of start 20 minutes to start 15 minutes can be seen. Here, by stream **, image offer 20 minutes after a start will be performed between image accumulation for 5 minutes, and image reverse order reproduction for 5 minutes. Then, if it changes to stream ** after the above-mentioned reverse order reproduction, an image 20 minutes after a start can be seen succeeding. Such processing is realizable also in a digital broadcast system of drawing 1(a). In same form, a stream. ***** Data for 5 minutes is stored supposing that there is -- and looking at stream **, Reverse order reproduction of data (after 15 minutes – 20 minutes) stored promptly (after 20 minutes) when there are directions of reverse order reproduction from a user is performed. It switches to stream **, data (after 10 minutes – 15 minutes) is stored, and reverse order reproduction which continued when it switched with stream ***** and went, performing reverse order reproduction succeeding is attained.

[Translation done.]

* NOTICES *

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3. In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The figure (a) is an explanatory view showing the network system which can apply the video information transceiver graphic processing method of this invention, and the figure (b) is an explanatory view showing the digital broadcast system which can similarly apply the method concerned.

[Drawing 2] It is an explanatory view showing the image reverse order regeneration by transmission and reception of the video information of the embodiment of this invention.

[Drawing 3] It is an explanatory view showing image reverse order regeneration.

[Drawing 4] It is an explanatory view showing the image reverse order regeneration by transmission and reception of the video information of the embodiment of this invention.

[Explanations of letters or numerals]

- 11 Server
- 12 Information terminal
- 13 Internet
- 21 Broadcasting organization
- 22 Digital—broadcasting receiving set
- 23 Satellite

[Translation done.]

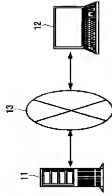
*** NOTICES ***

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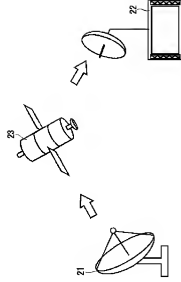
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DRAWINGS

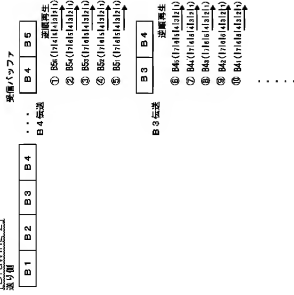
[Drawing 1]
(a)



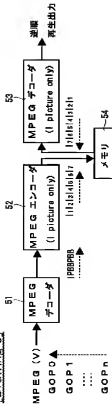
(b)



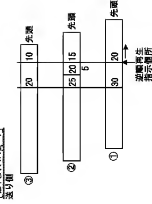
[Drawing 2]



[Drawing 3]



[Drawing 4]



[Translation done.]

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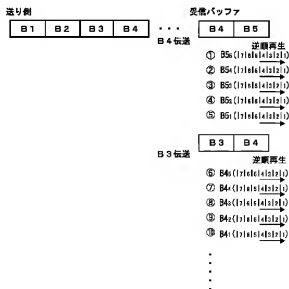
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(54) 【発明の名称】 映像情報送受信映像処理方法

(57) 【要約】

【目的】 送り側でわざわざ逆再生用の M P E G 動画等を用意することなく、受信側ではストリーミングサービスに対し M P E G 動画等を滑らかに逆再生することができるデジタル情報送受信方法を提供する。

【構成】 映像情報の送信側では、M P E G 動画を複数ブロック化し (B 1 ~ B 5)、時間的に後方のブロック (B 5) から受信側へ送出する。受信側ではブロック B を受け取ると、当該ブロック B 内の時間的に後方の G O P を取り出して各映像を I ピクチャに変換し (I₁ I₂ I₃ I₄ I₅ I₆)、I ピクチャ映像の逆順並べ替え処理を行い (I₁ I₆ I₅ I₄ I₃ I₂ I₁)、映像表示する。そして、前記 G O P に対する前記処理をブロック内で時間的逆方向に並ぶ G O P の順に実行し、この一ブロックに対して行う逆順化処理を次のブロックに対して順次行っていく。



【特許請求の範囲】

【請求項1】 映像情報の送信側では、一纏まりの映像情報を複数ブロック化し、時間的に後方のブロックから受信側へ送出し、受信側ではブロックを受け取ると、当該ブロック内の時間的に後方の映像群単位を取り出して映像群単位内で各映像を独立再生可能な形態に変換した後に映像の逆順並べ替え処理を行い、前記映像群単位に対する前記処理をブロック内で時間的逆方向に並ぶ映像群単位の順に実行し、前記ブロックに対して行う逆順化処理を次のブロックに対して順次行なっていくことを特徴とする映像情報送受信映像処理方法。

【請求項2】 請求項1に記載の映像情報送受信映像処理方法において、一ブロックに対して前記逆順化処理を行なっている間に、次のブロックの送受信処理を実行することを特徴とする映像情報送受信映像処理方法。

【請求項3】 映像情報の送信側では、複数の同一の一纏まりの映像情報について互いに時間をずらして別ストリームとして各々先頭から送出する処理を実行し、受信側では逆順再生の要求に合わせてストリーム切り替えを行ない、逆順再生の要求時点の映像が入手されるまで映像情報を蓄積し、この蓄積した映像情報に対して時間的に後方の映像群単位を取り出し、映像群単位内で各映像を独立再生可能な形態に変換した後に映像の逆順並べ替え処理を行い、前記映像群単位に対する前記処理を蓄積映像情報内で時間的逆方向に並ぶ映像群単位の順に実行することを特徴とする映像情報送受信映像処理方法。

【発明の詳細な説明】

【0001】

【産業上の利用分野】この発明は、映像情報送受信映像処理方法に関する。

【0002】衛星や地上波を用いたデジタル放送を受信するデジタル放送受信装置は、専用のアンテナや地上波用アンテナを通して受け取った複数の放送波のなかから任意の放送波をチューナによって選択し、この選択した放送波に含まれる複数のチャンネルの中から任意のチャンネルをデマルチプレクス処理によって選択し、この選択したチャンネルのデジタル信号を取り出し、これをデコードすることによって映像・音声信号を出力することができる。

【0003】このようなデジタル放送システムでは、数多くのチャンネルを有することにより、例えば、映画放送を10分間隔ですらして複数のチャンネルで放送することが可能である。これにより、個々の視聴者は自分の時間に合わせて放送を初めから見るといったことが可能となる。また、このような放送は、ケーブルテレビやインターネット放送のIPマルチキャストサービスにおいても、実現することができる。なお、かかるサービスはNVD (near video on demand) と呼ばれている。

【0004】

【発明が解決しようとする課題】デジタル放送システム等では、映像や音声はMPEG2 (Moving Picture Experts Group 2) の方式に基づいて処理し、ビデオストリーム及びオーディオストリームを生成している。そして、本願出願人は、このようなMPEG方式の動画に対して滑らかに逆再生を行なう方法を先に公開しているが (特開2001-346165号公報参照：IPC H04N 5/92)、デジタル放送システム等のストリーミングサービスのリアルタイムな逆再生については考慮していない。ところが、映像を逆再生して得た逆再生映像のデジタル情報に基づくMPEG方式の動画を送り手側で用意しておき、この逆再生MPEG動画を送信するようにすれば、受信側では通常のMPEG再生処理で逆再生映像を見ることができるのであるが、これでは送り手側でわざわざ逆再生MPEG動画を用意しておく必要が生じてしまう。

【0005】この発明は、上記の事情に鑑み、送り手側でわざわざ逆再生用のMPEG動画を用意することなく、受信側ではストリーミングサービスに対しMPEG動画を滑らかに逆再生することができるデジタル情報送受信方法を提供することを目的とする。

【0006】

【課題を解決するための手段】この発明の映像情報送受信映像処理方法は、上記の課題を解決するために、映像情報の送信側では、一纏まりの映像情報を複数ブロック化し、時間的に後方のブロックから受信側へ送出し、受信側ではブロックを受け取ると、当該ブロック内の時間的に後方の映像群単位を取り出して映像群単位内で各映像を独立再生可能な形態に変換した後に映像の逆順並べ替え処理を行い、前記映像群単位に対する前記処理をブロック内で時間的逆方向に並ぶ映像群単位の順に実行し、前記ブロックに対して行う逆順化処理を次のブロックに対して順次行なっていくことを特徴とする。

【0007】上記の構成であれば、送り手側でわざわざ逆再生用映像情報を用意することなく、通常の映像情報を用意しておき、送出の段階で時間的に後方のブロックを取り出して送信することで済む。そして、受信側では、受け取ったブロック内の時間的に後方の映像群単位を取り出して各映像を独立再生可能な形態に変換した後に映像の逆順並べ替え処理を行い、前記映像群単位に対する前記処理をブロック内で時間的逆方向に並ぶ映像群単位の順に実行するので、逆再生映像を見ることができ

る。

【0008】一ブロックに対して前記逆順化処理を行なっている間に、次のブロックの送受信処理を実行するのがよい。これによれば、ブロック間での逆再生の途切れを回避することができる。

【0009】また、この発明の映像情報送受信映像処理方法は、映像情報の送信側では、複数の同一の一纏まり

の映像情報について互いに時間をずらして別ストリームとして各々先頭から送出する処理を実行し、受信側では逆順再生の要求に合わせてストリーム切り替えを行ない、逆順再生の要求時点の映像が入手されるまで映像情報を蓄積し、この蓄積した映像情報に対して時間的に後方の映像群単位を取り出し、映像群単位内で各映像を独立再生可能な形態に変換した後映像の逆順並べ替え処理を行い、前記映像群単位に対する前記処理を蓄積映像情報内で時間的逆方向に並ぶ映像群単位の順に実行することと特徴とする。

【0010】これによれば、デジタル放送やIPマルチキャストのN・VODにおいても逆再生映像を見ることができ。

【0011】

【発明の実施の形態】まず、図3を用いてMPEG動画の逆再生処理について簡単に説明する。MPEGデコーダ51は、MPEG動画の映像群単位（以下、GOPという）が時間的に後のものから順次供給される。MPEGデコーダ51は、各GOPを復号してIピクチャ、Pピクチャ、及びBピクチャを生成する。Iピクチャは、フレーム内符号化処理によって過去や未来の再生画像とは無関係に独立して生成される画像であり、GOP内に少なくとも1枚存在する。Pピクチャは、フレーム間符号化処理によって順方向予測により生成される。Bピクチャは、フレーム間符号化処理によって双方向予測により生成される。MPEGエンコーダ52は、MPEGデコーダ51から出力されるIピクチャ、Pピクチャ、及びBピクチャを入力する。ここでは、1GOPにつき7枚のピクチャが入力されると仮定する。MPEGエンコーダ52はPピクチャ及びBピクチャをIピクチャ化する処理を行なう。これにより、7枚のIピクチャが生成される。7枚のIピクチャは正順に並んでおり、その順序をI₁I₂I₃I₄I₅I₆I₇と表す。I₁I₂I₃I₄I₅I₆I₇は一旦メモリ54に格納され、I₇I₆I₅I₄I₃I₂I₁の順で読み出される。MPEGデコーダ53はメモリ54から7枚のIピクチャをI₇I₆I₅I₄I₃I₂I₁の順で受け取り、これらIピクチャの復号処理を順次行なって動画像を生成していく。かかる処理が次に時間的に後のGOPに対して順次行なわれていくことで、逆順再生が実現される。

【0012】図1は、この実施形態の映像情報送受信映像処理方法を表した図であって、同図（a）はインターネットによるストリームサービスにおいて適用される場合を示し、同図（b）はデジタル放送システムに適用される場合を示している。

【0013】同図（a）に示す例では、サーバー11と情報端末（パーソナルコンピュータや携帯端末等）12とがインターネット13を介して接続され、前記サーバー11からクライアントである情報端末12へとコンテンツ（ここでは、MPEG動画とする）が配信される。サーバー11は、逆再生MPEG動画を用意するのは

なく、通常のMPEG動画を用意しておけばよい。サーバー11が情報端末12から逆順再生の要求を受け取ると、サーバー11は、MPEG動画（一纏まりの映像情報）を複数ブロック化し、時間的に後方のブロックから受信側へ送出することになる。

【0014】同図（b）に示す例では、放送事業者装置21によってアップリンクされたデジタル情報（変調された電波）が衛星23のトランスポンダを経由して家庭内のデジタル放送受信装置22に到達する。なお、図示はしていないが、地上波デジタル放送であれば、地上波放送局からのデジタル情報（変調された電波）が家庭内或いは携帯型のデジタル放送受信装置22に到達することになる。このように、デジタル放送波によってコンテンツ（ここでは、MPEG動画とする）が配信される。放送事業者装置21は、逆再生MPEG動画を用意するのではなく、通常のMPEG動画を用意しておけばよい。そして、或るチャンネルを逆順再生用に割り当てておき、このチャンネルによる伝送では、放送事業者装置21は、MPEG動画（一纏まりの映像情報）を複数ブロック化し、時間的に後方のブロックから送出することになる。

【0015】ここで、図2に示すように、MPEG動画がB₁～B₅の5つにブロック化されると、送り側はB₅、B₄、B₃、B₂、B₁の順序で送出する。従って、受信側では、まず、最も時間的に後のブロックB₅を受け取り、これをメモリに保持していくことになる。このブロックB₅の受け取り開始においては、ブロックB₅全体のデータはないため、逆再生は開始できない。ブロックB₅全体のデータを受け取った段階で、ブロックB₅内での最も時間的に後のデータが取得できたことになる。この後、メモリからは、ブロックB₅内での最も時間的に後の映像群単位（以下、GOPという）が読み出され、逆順再生処理が行なわれる。ここで、説明の便宜上、一つのブロックが5つのGOPから成るとする。ブロックB₅において、GOPは正順ではB₅₁、B₅₂、B₅₃、B₅₄、B₅₅のごとく並ぶと、また、1GOPにつき7枚のピクチャが存在すると仮定する。

【0016】図3をここで再び用いて説明すると、MPEGエンコーダ52は、まずB₅に存在するPピクチャ及びBピクチャをIピクチャ化する処理を行なう。これにより、7枚のIピクチャが生成される。7枚のIピクチャは正順に並んでおり、その順序をB₅（I₁I₂I₃I₄I₅I₆I₇）と表す。B₅（I₁I₂I₃I₄I₅I₆I₇）は一旦メモリ54に格納され、B₅（I₇I₆I₅I₄I₃I₂I₁）の順で読み出される。MPEGデコーダ53はメモリ54から7枚のIピクチャをB₅（I₇I₆I₅I₄I₃I₂I₁）の順で受け取り、これらIピクチャの復号処理を順次行なって動画像を生成していく。

【0017】次に、MPEGエンコーダ52は、B₅、

に存在するPピクチャ及びBピクチャをIピクチャ化する処理を行なう。これにより、7枚のIピクチャが生成される。7枚のIピクチャは正順に並んでおり、その順序をB5: (I I I I I I I I)と表す。B5: (I I I I I I I I)は一旦メモリ54に格納され、B5: (I I I I I I I I)の順で読み出される。MPEGデコーダ53はメモリ54から7枚のIピクチャをB5: (I I I I I I I I)の順で受け取り、これらIピクチャの復号処理を順次行なって動画像を生成していく。

【0018】上記の処理が、時間的後順のGOPに対して順次行なわれていくことで、ブロックB5における逆順再生が実現される。このブロックB5の逆順再生が完了したら、ブロックB4における逆順再生を開始することになり、このような処理が順次実行されることで、5つのブロックB1～B5から成るMPEG動画の逆順再生が行なわれることになる。

【0019】ここで、ブロックB5における逆順再生の処理と並行して、ブロックB4の受信処理を続けており、このブロックB4のデータをバッファに蓄えている。これにより、ブロックB5における逆順再生の完了の後に即座に次のブロックB4における逆順再生の処理に取りかかることができる。

【0020】図1(a)に示したインターネット13を利用する例であれば、情報端末12はバッファ量をサーバー11に伝えることが可能であり、サーバー11側では前記バッファ量に応じてブロックの大きさを変えることが可能である。

【0021】IPマルチキャストにおけるNVODでは、サーバー11は複数の同一のMPEG動画について互いに時間をずらして別ストリームとして各々先頭から送出する処理を実行することになる。そして、情報端末12は逆順再生の要求に合わせてストリーム切り替えを行ない、逆順再生の要求時点の映像が入手されるまでMPEG動画を蓄積し、この蓄積したMPEG動画に対して時間的に後方のGOPを取り出し、GOP内で各映像を独立再生可能なIピクチャに変換した後にIピクチャの逆順並べ替え処理を行い、前記GOPに対する前記処理を蓄積MPEG動画内で時間的逆方向に並ぶGOPの順に実行する。

【0022】例えば、図4に示すように、5分遅れで開始されるストリーム②③があるとし、情報端末12ではこのような5分遅れで開始されるストリーム②③があることを認識しているとする。そして、情報端末12ではストリーム①を取得していたとし、ユーザーが開始20分後に逆順再生指示を情報端末12に与えたとす

る。このとき、ストリーム②では開始15分後の映像提供が行なわれており、このストリーム②に切り替えて5分間の映像取得を行えば、開始15分後から20分後までの映像を情報端末12において蓄えることができる。そして、この蓄積した映像情報に対して前述の逆順処理を実行すれば、開始20分の時点から開始15分までの逆順再生映像を見ることができ。ここで、5分間の映像蓄積と5分間の映像逆順再生の間に、ストリーム③では開始から20分後の映像提供が行なわれることになる。そこで、上記逆順再生の後にストリーム③に切り替えれば、開始から20分後の映像を引き続き見ることができ。なお、このような処理は、図1(a)のデジタル放送システムにおいても実現できる。また、同様の形式でストリーム①②③④⑤⑥⑦…があるとし、ストリーム①を見ながら5分間のデータを蓄積しておき、ユーザから逆順再生の指示があったときに(20分後)直ちに蓄積しているデータ(15分後～20分後)の逆順再生を行い、ストリーム③に切り換えてデータ(10分後～15分後)を蓄積し、引き続いて逆順再生を行いながらストリーム⑤⑦と切り換えて行くと連続した逆順再生が可能となる。

【0023】

【発明の効果】以上説明したように、この発明によれば、送り手側でわざわざ逆再生用のMPEG動画を用意することなく、受信側ではストリーミングサービスに対しMPEG動画を滑らかに逆再生することができるといふ効果を奏する。

【図面の簡単な説明】

【図1】同図(a)はこの発明の映像情報送受信映像処理方法を適用できるネットワークシステムを示した説明図であり、同図(b)は同じく当該方法を適用できるデジタル放送システムを示した説明図である。

【図2】この発明の実施形態の映像情報の送受信による映像逆順再生処理を示した説明図である。

【図3】映像逆順再生処理を示した説明図である。

【図4】この発明の実施形態の映像情報の送受信による映像逆順再生処理を示した説明図である。

【符号の説明】

11 サーバー

12 情報端末

13 インターネット

21 放送事業者

22 デジタル放送受信装置

23 衛星

